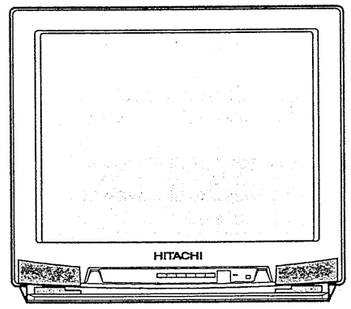
HITACHI

HCPT | No. 246E

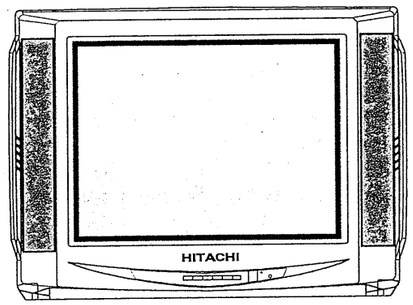
SERVICE MANUAL

PAL / SECAM / NTSC

V2 CHASSIS



C2045MS, C2145MS, C2048FS,
C2148FS



C2081MS, C2181MS, C2086FS, C2186FS,
C2081MSR, C2181MSR

CAUTION : Before servicing this chassis, it is important that the service technician reads the "Safety Precaution" and "Product Safety Notices" in this Service Manual.

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SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT.

COLOR TELEVISION

September 1999 **Hitachi Consumer Products (Thailand), Ltd.**

SAFETY PRECAUTIONS

WARNING: The following precautions should be observed.

1. Do not install, remove, or handle the picture tube in any manner unless shatter proof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep the picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on the chassis.
3. When replacing the chassis in the cabinet, ensure all the protective devices are put back in place, such as barriers, non-metallic knobs, adjustment or compartment covers or shields, isolation resistors/capacitors, etc.
4. When service is required, observe the original lead dressing. Extra precaution should be taken to assure correct lead dressing in the high voltage circuitry area. Particularly note the R.G.B. lead dressing. Ensure they are dressed well away from the horizontal scan and F.B.T. circuitry.
5. Always use the manufacturer's replacement component. Always replace original spacers and maintain lead lengths. Especially critical components are indicated thus ⚠ on the parts list and should not be replaced by other makes. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing. Therefore, the following checks are recommended for the continued protection of the customers and service technicians.

INSULATION

Insulation resistance should not be less than 7MΩ at 500V DC between the mains poles and any accessible metal parts. Also, no flashover or breakdown should occur during the dielectric strength test, applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts.

HIGH VOLTAGE

High voltage should always be kept at the rated value of the chassis and no higher. Operating at higher voltages may cause a failure of the picture tube or high voltage supply, and also, under certain circumstances could produce X-radiation moderately in excess of design levels. The high voltage must not, under any circumstances, exceed 33.4kV on the chassis.

X-RADIATION

TUBES: The primary source of X-radiation in this receiver is the picture tube. The tube utilised for the above mentioned function in this chassis is specially constructed to limit X-radiation.
For continued X-radiation protection, replace tube with the same type as the original HITACHI approved type.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection, nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a ⚠ on the schematics and replacement parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create electrical shock, fire, X-radiation, or other hazards.
Product Safety is continuously under review, and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of HITACHI Service Manuals, may be obtained at a nominal charge from your HITACHI SALES OFFICES.

TUBE DISCHARGE

The line output stage can develop voltages in excess of 25kV; if the E.H.T.cap is required to be removed, discharge the anode cap to chassis via a high value resistor, prior to its removal from the tube.

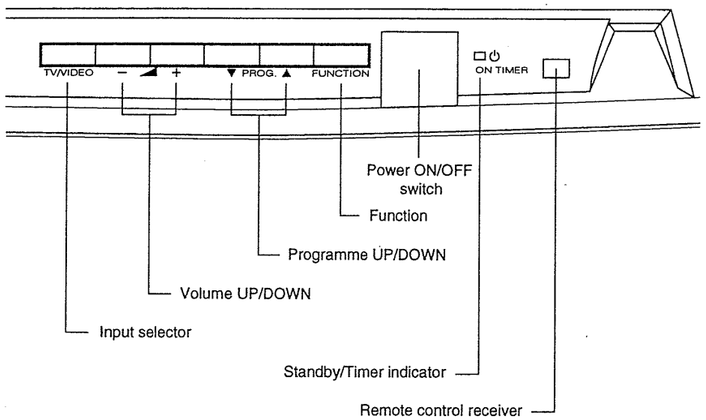
SPECIFICATIONS

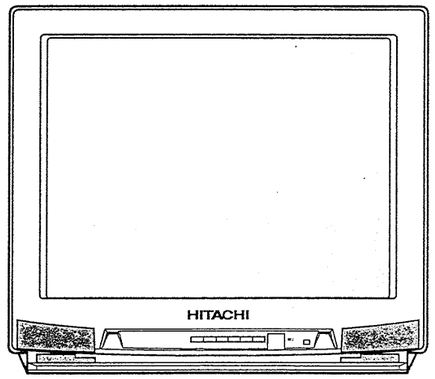
RECEPTION SYSTEM		C2045MS	C2145MS	C2048FS	C2148FS	C2081MS	C2181MS	C2086FS	C2186FS	C2081MSR	C2181MSR
625 - LINES	B.G AAL	0	0	0	0	0	0	0	0	0	0
	B.G /I/D.K/H PAL	0	0	0	0	0	0	0	0	0	0
	B.G/D.K/K1 SECA	0	0	0	0	0	0	0	0	0	0
	NTSC50			0	0			0	0		
	NTSC50 (VIDEO)	0	0	0	0	0	0	0	0	0	0
525 - LINES	NTSC3.58			0	0			0	0		
	NTSC3.58 (VIDEO	0	0	0	0	0	0	0	0	0	0
	NTSC4.43	0	0	0	0	0	0	0	0	0	0
	PAL60	0	0	0	0	0	0	0	0	0	0
	SECAM60	0	0	0	0	0	0	0	0	0	0
CHANNEL COVERAGE		FREQUENCY RANGE : 44MHz ~ 863MHz									
COLOR PICTURE TUBE		A48 LGS 10X	A51 LMU 10X	A48 LGS 10X	A51 LMU 10X	A48 LGS 10X	A51 LMU 10X	A48 LGS 10X	A51 LMU10X	A48 LGS 10X	A51 LMU 10X
COLOR PICTURE TUBE (SIZE)		20"	21"	20"	21"	20"	21"	20"	21"	20"	21"
SPEAKER		5x9 (x2)	5x9 (x2)	5x9 (x2)	5x9 (x2)	5x9 (x2)	5x9 (x2)	5x9 (x2)	5x9 (x2)	5x9 (x2)	5x9 (x2)
SOUND OUTPUT		5W + 5W	5W + 5W	5W + 5W	5W + 5W	5W + 5W	5W + 5W	5W + 5W	5W + 5W	5W + 5W	5W + 5W
POWER SUPPLY		AC 100 ~ 264V / 60Hz									
POWER CONSUMPTION		86	89	86	89	86	89	86	89	86	89
AERIAL INPUT		75 UNBALANCED TYPE									
DIMENSIONS (W x H x D) mm.		512x453x477	512x453x477	613x438x465	613x438x465	613x438x465	613x438x465	613x438x465	613x438x465	613x438x465	613x438x465
WEIGHT		18.6 Kg	21 Kg	18.6 Kg	21 Kg	19.2 Kg	21 Kg	19.2 Kg	21 Kg	19.2 Kg	21 Kg

NOTE : FREQUENCY FM RADIO 64MHz ~ 75MHz, 87.5MHz ~ 108MHz, 76MHz ~ 108MHz (FOR C2081MSR , C2181MSR)

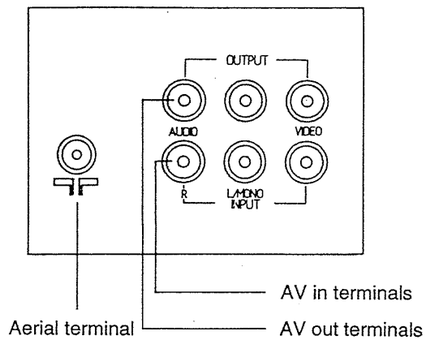
CONTROLS/REMOTE CONTROL UNIT

Front Panel

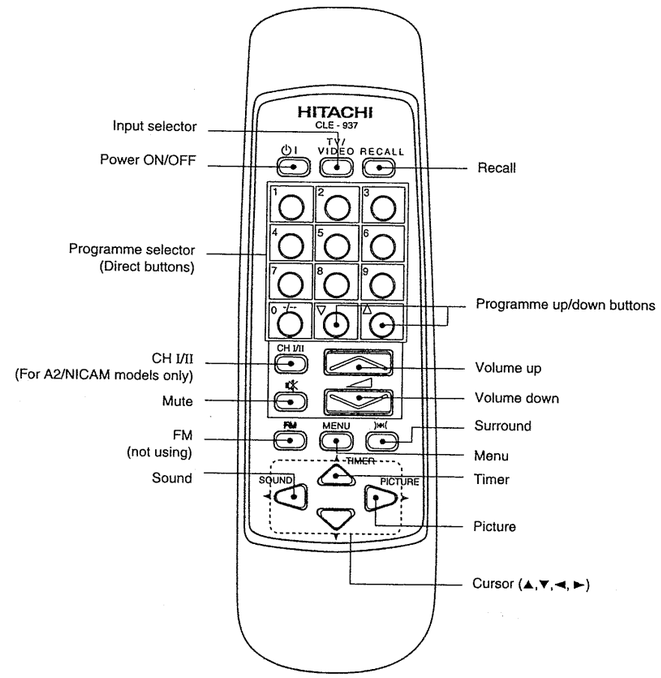




Rear Panel

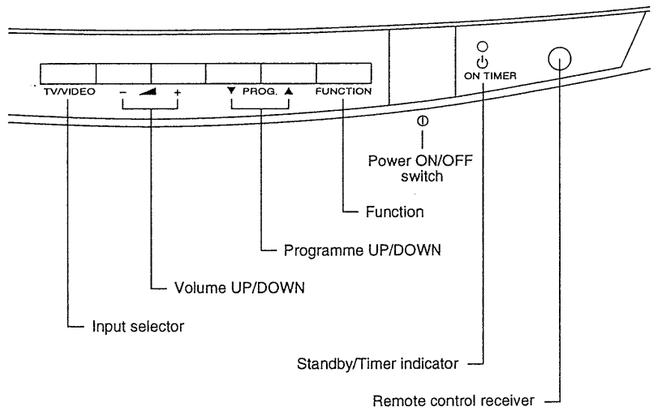


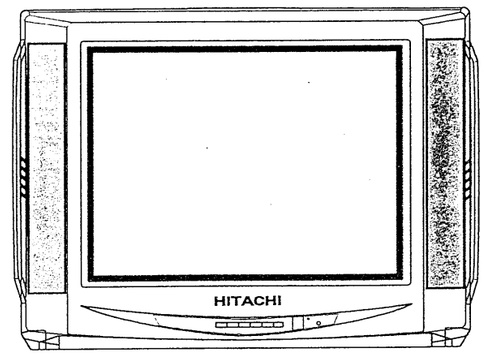
Remote Control Unit



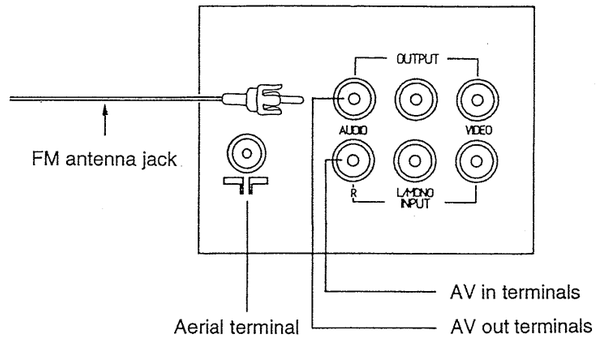
CONTROLS/REMOTE CONTROL UNIT

Front Panel

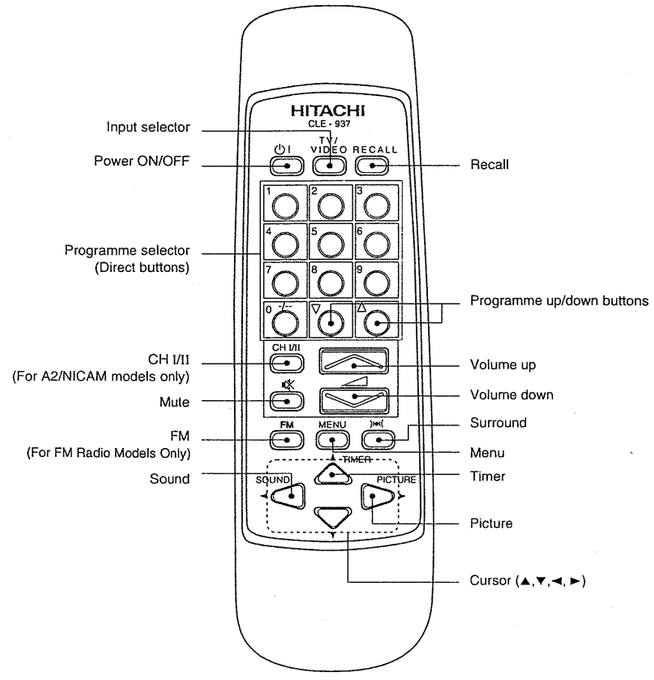




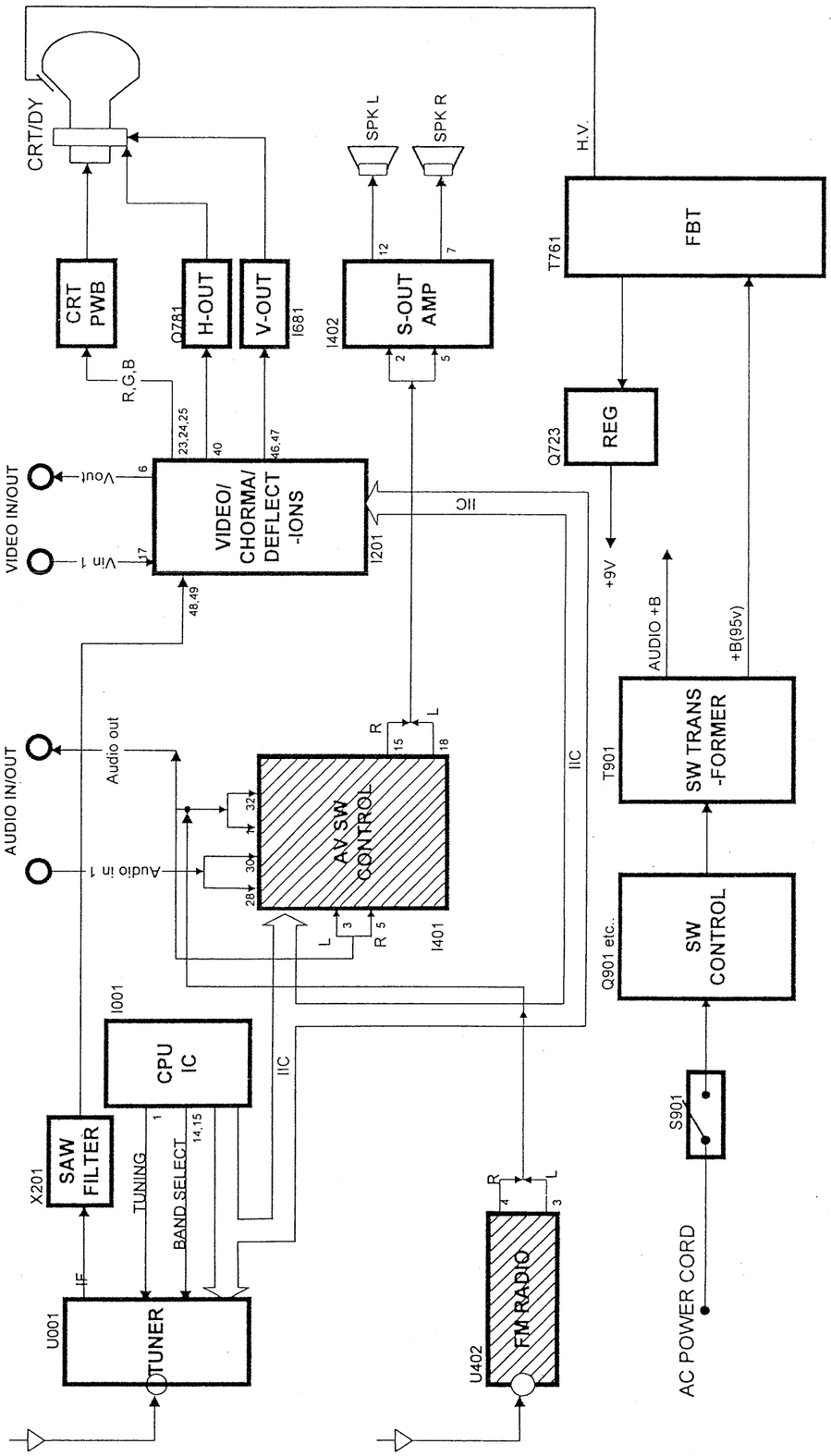
Rear Panel



Remote Control Unit



BLOCK DIAGRAM OF V2 CHASSIS



CIRCUIT DESCRIPTION

Selection and CPU circuitry

IC type, Z90234, performs functions like IIC controls, channel selection, on-screen displays, search tuning, systems selection amongst others. The pin functions of Z90234 is presented in table form as shown below :

PIN NO.	NAME	I/O	FUNCTION
1	VT	Output	Voltage tuning PWM waveform
2	SW2	Output	Message IC sound/audio input 1 selector output.
3	SPAT.1	Output	Spatializer control output 1 (NC)
4	MUTE	Input	Mute control during power on/off
5	WRITE-ENABLE	Output	Write-enable control output for FM radio board
6	CLOCK	Output	Clock signal for FM radio board
7	ALARM	Output	Alarm sound control output. Frequency 1 KHz.
8	SPAT.2	Output	Spatializer control output 2 (NC)
9	PLAY	Output	Play control output for message IC
10	REC	Output	Record control output for message IC
11	POWER	Output	Power ON/OFF control. H: ON, L: OFF
12	M	Output	Output signal for saw filter control.
13	GND		Ground
14	BAND1	Output	Output signal for band selection
15	BAND2	Output	Output signal for band selection
16	SCAN1	Output	Output signal for front panel matrix
17	SCAN2	Output	Output signal for front panel matrix
18	SCAN3	Output	Output signal for front panel matrix
19	RETURN1	Input	Return signal of front panel matrix
20	LED	Output	Output signal for LED control
21	RETURN2	Input	Return signal of front panel matrix
22	B	Output	Blue output for OSD
23	G	Output	Green output for OSD
24	R	Output	Red output for OSD
25	FB	Output	OSD blanking output signal
26	HSYNC	Input	Horizontal synchronous signal i/p pin for OSD
27	VSYNC	Input	Vertical synchronous signal i/p pin for OSD
28	OSD OSC.	I/O	Oscillator for OSD
29	OSD OSC.	I/O	Oscillator for OSD
30	X.GND		Crystal ground
31	X.IN	Input	Clock in
32	X.OUT	Output	Clock out
33	RESET	Output	Reset terminal. H: Normal, L: Reset
34	Vcc		Voltage supply reference
35	DATA	Output	Data output for FM radio
36	R/C	Input	Remote control signal input
37	SCL1	I/O	IIC data i/o for EEPROM
38	SDA1	I/O	IIC clock select for EEPROM
39	SCL	I/O	Main clock line
40	SDA	I/O	Main data lin
41	BG/DK	Output	Port control for sound system select (M:H, BG:L, I:H, DK:L)
42	M/I	Output	Port control for sound system select (M:H, BG:H, I:L, DK:L)

TUNER AND IF CIRCUIT

The Tuner(U001) used on V2 chassis is powered by the 9V supply, it is IIC Bus controlled and covers VHF, UHF and CATV Band(Mid, Supper and Hyper).
The IF output from Tuner(pin 11 of U001) is applied to the amplifier Q201, SAW filter X201 and I201.
For Multi-systems model with M-NTSC, switchable SAW filter is used. Q210 at pin 10 of X201 serves to select the IF signal between M/N mode to other modes (e.g. B/G, D/K)before demodulation is made at I201 (TDA8842) and I451(MM1053XS).
i.e. When M/N mode :

Base of Q210 ⟶ High

After the demodulation of IF signals from I201pin 48 & 49, the composite video signals are resulted at pin 6 of I201 for further Video signals processing and Audio sound selection.
For Mono sound models, the composite signal output from pin 6 of I201 is input to a series of bandpass filters(X401~X404) and select with the mode shown in table 1 at I451. The selected signal(e.g. M, B/G, I, or D/K) is then input to pin 1 of I201 via C401.

Table 1.

I451 pin 2	I451 pin 3	Audio Out At pin 1 of I451
H	H	M(4.5MHz)
L	H	B/G(5.5MHz)
H	L	I(6MHz)
L	L	D/K(6.5MHz)

After the FM demodulation performed by I201, the sound output is given at pin 55 and pin 15(where sound signal at pin 15 already added with Volume control, mute control & other control elements from IIC in I201). With sound output from pin 15, it is then input to pin 2 & 5 of I402(AN5275) for further amplification, and output to the Speakers from pin 7 & 12 of I402.
For the output AV terminal, sound output from pin 55 of I201 is connected to the rear via Q401/Q402, at this point, the audio signal can be output to external equipment if desired.
For Stereo sound models, the IF signal is sent to pin 3 of Nicam/A2 module(U401) where sound system selection, and demodulation are made. The Nicam/A2 Stereo sound output is given at pin 13(L), pin 14(R), pin 16(L) & pin 17(R) of U401. For Nicam/A2 models, the sound outputs from pin 13 & 14 are connected to audio out AV terminals, and pin 16 & 17 are connected to I401(TDA9859) where AV output selection are perform. Volume control for both mono and stereo system are made via IIC Bus in I201 or I401 respectively.
The composite video signal output from pin 6 of I201 is also applied to the SIF rejection filter X202~ X204, the resulting signal is connected to the Video out terminal and return to pin 13 of I201 for color decoding and deflection synchronization etc....

VIDEO/CHROMA

I201(TDA8842) which incorporates VIDEO/CHROMA/ DEFLECTIONS is used to perform auto color identification of PAL/SECAM/NTSC, sync separation, AFC, H/V oscillator and output stage RGB signals etc...
Video signals from RF, Video 1 and Video 2 entered I201 via pin 13, 17 and 11 respectively.
At I201, which input signals(RF, Video 1 or Video 2) to be proceeded are selected by IIC Bus and video signal is demodulated by means of an alignment-free PLL carrier regenerator with an internal VCO. After the color identification and decoding in I201, the color difference signals are matrixed with the luminance signal to obtain the RGB signals which can be controlled on Contrast and Brightness.
The outputs RGB are finally emerged from pin 23~25 of I201 after combined with OSD RGB are then output to CRT PWB.
Internal sync separator and H/V oscillator of I201 produce H drive and V drive signals which are applied to Deflection circuits for processing of Horizontal and Vertical scanning.

HORIZONTAL DEFLECTION

This circuit uses the horizontal deflection yoke(H. DY) to deflect the electron beam of the CRT horizontally. It also generates high-voltage and medium/low voltage power supplies through FBT. At pin 13, 11 & 17 of I201, the selected composite video signal is applied to the internal separator and phase detector/ correction of I201, the resulted horizontal drive pulse is output from pin 40 of I201.
The horizontal drive pulse is supplied to the horizontal drive circuit consisted of Q721, Q781 and T761. At the horizontal output transistor Q781, it generates a FBT pulse of approximately 1000V at the collector and also causes a sawtooth current to flow to the H.DY, thus deflecting the electron beam in the CRT horizontally. This FBT pulse also causes a high voltage(H.V) and medium/low voltages(i.e. 200V, 16V & 11V) to be generated at the secondary circuit of FBT T761.
The high-voltage beam current is supplied from the +B(95V) to the ACL(Automatic Contrast Limiter) terminal of the FBT. This produces a voltage proportional to the variations in the brightness at the ACL terminal.

VERTICAL DEFLECTION

At I201, the selected composite video signal from pin 13, 11 or 17 is applied to the internal integrated circuit, V separation circuit and V C/D circuit which counts down the horizontal frequency to obtain the vertical frequency. C605 at pin 51 of I201 is used for ramp generation, and produces the required sawtooth waveform output from pin 46 and 47.
The vertical drive outputs from pin 46 and 47 are applied to pin 2 and 1 of I681 via R601 and R602 respectively. The vertical output to drive the DY is made available at pin 7. The flyback voltage at pin 6 of I681 is applied to pin 7 during flyback period through the voltage switching circuit in I681. This will make the flyback line faster.
The V size, V center and V slope can be adjusted by IIC control.

POWER SUPPLY CIRCUIT

The power supply circuit of V2 chassis is as below.
(1) Starting Operation
Power switch S901 turned ON⟶ Rectified at D901 ~D904 ⟶Voltage at Q903 base rises⟶ First switching pulse generated at winding P1-P2 of T901 ⟶Drive voltage⟶ Provide to Q905 of winding B1-B3 of T901⟶ Q905 supply stable drive voltage and L903 provide drive current to Q903 base ⟶Come into normal operations.
(2) Switching Constant Voltage Operation
AC input voltage rises or +B load decreased(picture get dark)⟶ +B(95V) rises⟶ Ic increased at Q951⟶ Id increased at I901⟶ Ic increased at I901⟶ Voltage decreased at pin 5 of I901 ⟶ON period of Q901 increased ⟶ON period of Q903 decreased ⟶ Positive voltage of D951 anode decreased⟶+B voltage falls ⟶+B voltage stabilized.
(3) Standby Operation
Remote control power OFF⟶ I001 pin 11 ⟶ Q954 off⟶Q953 off⟶ I201 Vcc pin 37 ⟶ Horizontal deflection stopped.
Also ⟶Q952 off⟶R953 connect into R952⟶ Voltage of Q951 base rises ⟶ON period of Q903 is slightly decreased by I901⟶ +B voltage falls(about 65V) ⟶Power consumption decreased.
+5W power provided from T901(S2) winding through D952 and C954⟶ 5V at pin 34 of I001 stabilized by Q003 and D004.

AUDIO SWITCHING

For Mono models C2120PN & C2123MN, the audio switching is performed by I201 from the following locations.
a. From RF(input at pin 1 of I201)
b. From AV-in 1 and AV-in 2 terminal(input at pin 2 of I201)

By the control of IIC, the desired audio signal is selected and output at pin 15(I201) and transferred to audio amplifier I402.

For Stereo model(without Nicam/A2) C2128FS, the audio switching is performed by I401(TDA9859) from the following sources.
a. RF audio from pin 15 of I201(parallel input to pin 3 & 5 of I401).
b. Audio from L & R of AV-in 1 terminal(input to pin 28 & 30 of I401).
c. Audio from L & R of AV-in 2 terminal(input to pin 1 & 32 of I401).

By the control of IIC, the desired audio signal is selected and output at pin 15(R) & pin 18(L) of I401 and transfer to I402.

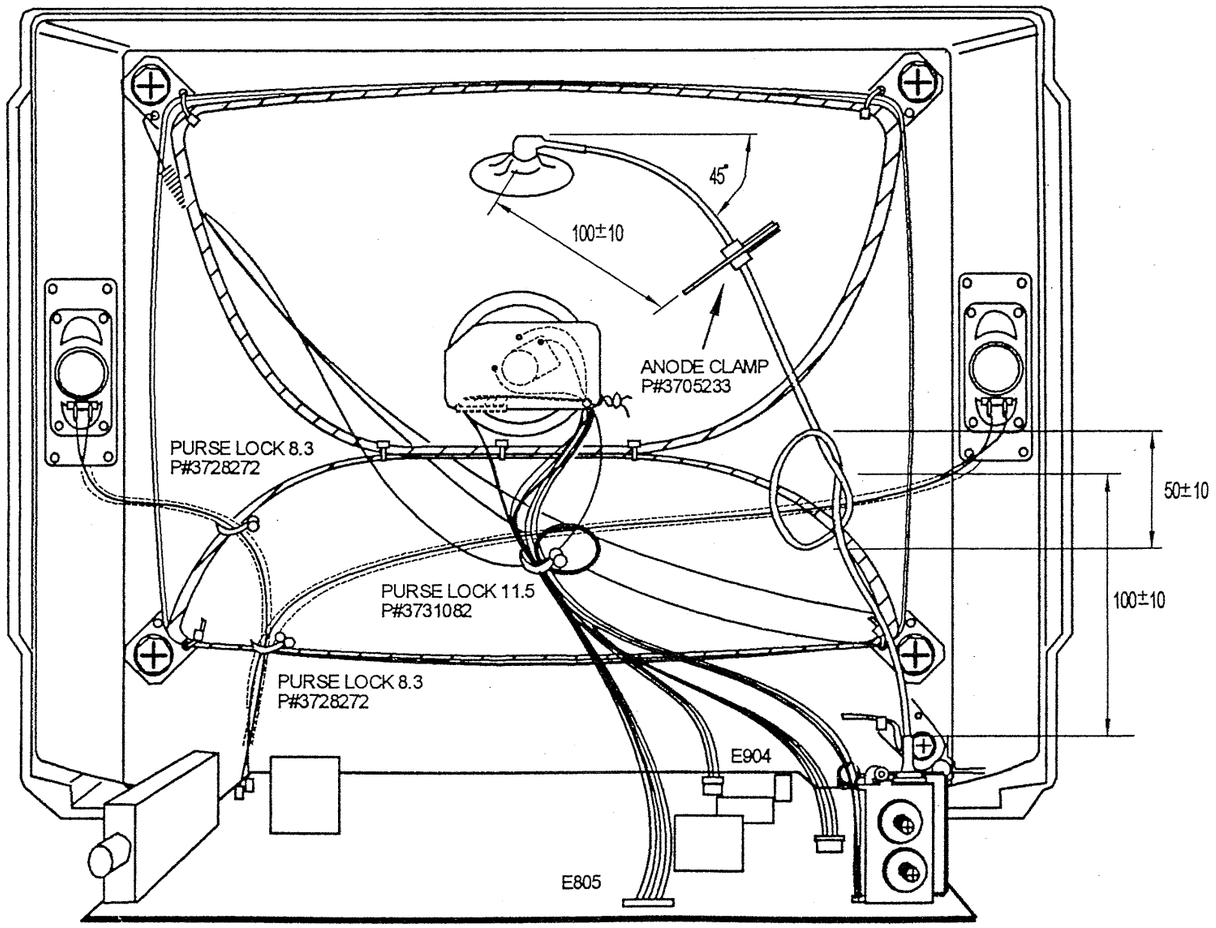
For Stereo model(with Nicam/A2) C2198FS, the audio switching is performed by I401(TDA9859) from the following sources.
a. RF stereo sound from pin 13 & pin 14 of U401 (input to pin 3 & 5 of I401).
b. Audio from L & R of AV-in 1 terminal(input to pin 28 & 30 of I401).
c. Audio from L & R of AV-in 2 terminal(input to pin 1 & 32 of I401).

By the control of IIC, the desired audio signal is selected and output at pin 15(R) & pin 18(L) of I401 and transfer to I402.

For Stereo model(with FM Radio)C2125MS, the audio switching is performed by I401(TDA9859) from the following sources.
a. RF audio from pin 15 of I201(parallel input to pin 3 & 5 of I401).
b. Audio from L & R of AV-in 1 terminal(input to pin 28 & 30 of I401).
c. Audio from L & R of AV-in 2 terminal or Sound from L & R of FM radio(input to pin 1 & 32 of I401).

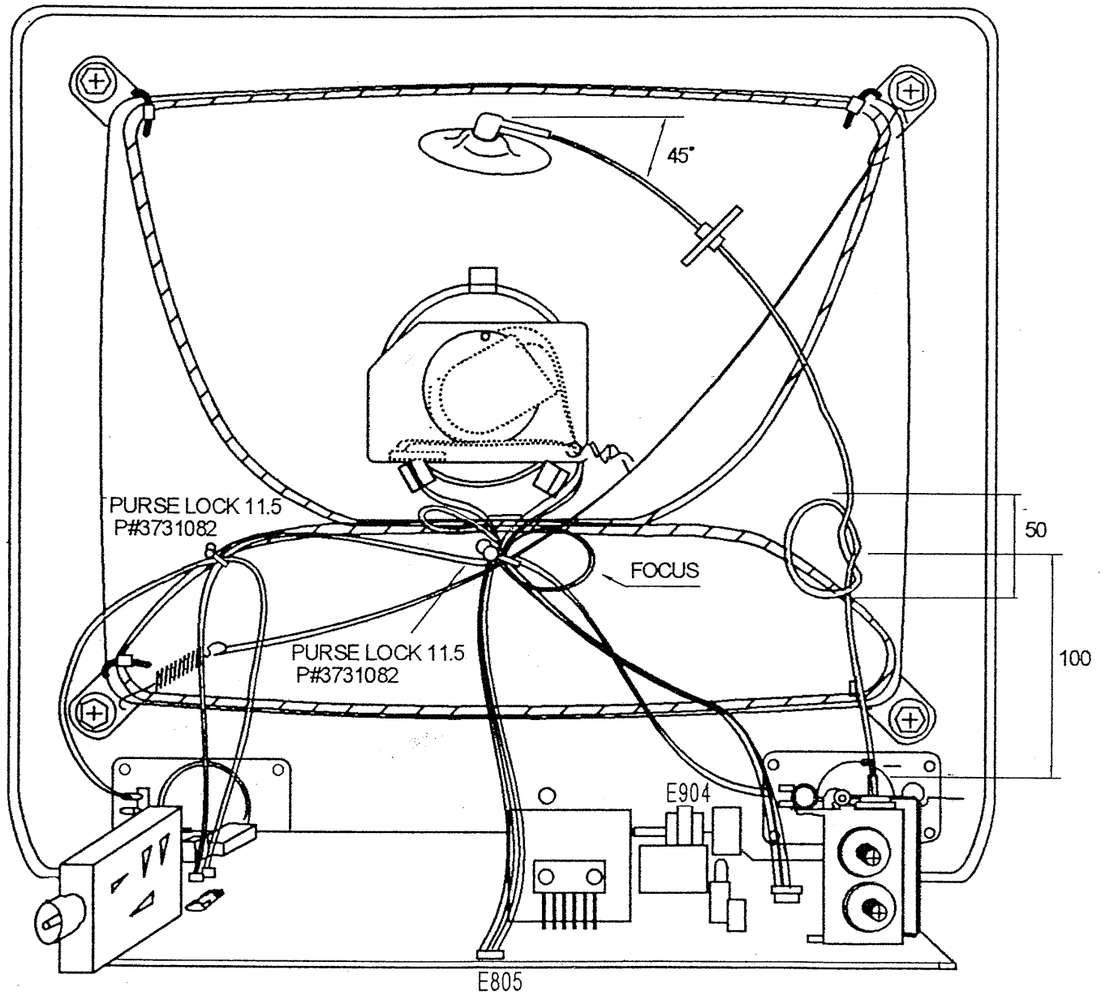
By the control of IIC, the desired audio signal is selected and output at pin 15(R) & pin 18(L) of I401 and transfer to I402.

WIRING DIAGRAM



C2081MS, C2181MS, C2086FS, C2186FS
C2081MSR, C2181MSR

WIRING DIAGRAM

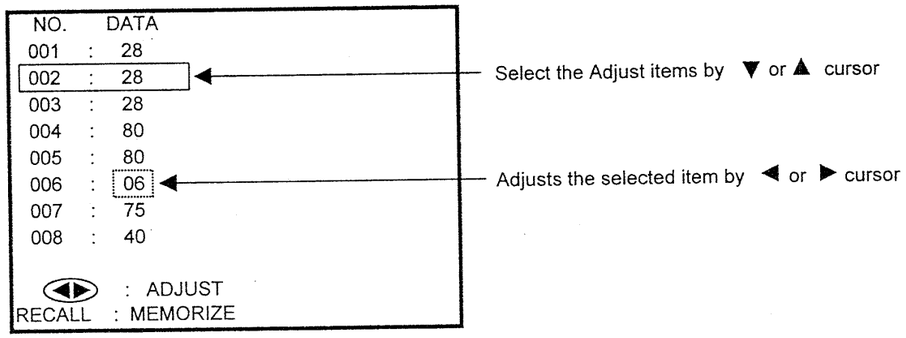


C2045MS, C2145MS, C2048FS
C2148FS

ADJUSTMENT INSTRUCTIONS

IIC ADJUSTMENTS

Most of the adjustment items in the V2 chassis are controlled by IIC. Adjustment items include video chroma IC control, sound multiplex Ics, horizontal & vertical deflection and others.
To start the IIC adjustment, first turn off the AC power swith. Press and hold down the TV/Video key and then press the power switch. Release both buttons after the following display appears on screen.



To select the adjustment items(e.g. RGB level, sub-brightness level etc...), press the ▼ or ▲ cursor button on Remote control handset. To adjust the data of selected item, press the ◄ or ► cursor button on Remote control handset.
After completing the adjustments, press the RECALL button on Remote control handset to memorize the data. Press MENU button or turn off the TV set to end the IIC adjustment.

The following are the IIC Bus control and adjustment datas for your reference.

IIC BUS CONTROL AND ADJUSTMENT

ADJ No.	NAME OF ADJUSTMENT DATA	DATA RANGE	INITIAL DATA(h)	ITEMS AFFECTED DURING CHANGE		
				EEPROM	CPT	TDA8842
1	WHITE POINT R	00~3F	1F	O	O	O
2	WHITE POINT G	00~3F	1F	O	O	O
3	WHITE POINT B	00~3F	1F	O	O	O
6	HORIZONTAL POSITION	00~3F	21	O	O	O
7	SUB-COLOUR	00~3F	1F	O	X	O
8	SUB-TINT	00~3F	1F	O	X	O
9	SUB-BRIGHT	00~3F	1F	O	X	O
10	SUB-CONTRAST	00~3F	17	O	X	O
11	SUB-SHARPNESS	00~3F	1F	O	X	O
12	SWITCH-ON BEHAVIOUR	00~01	0	O	X	O
13	PHASE 1 TIME CONSTANT	00~03	0	O	X	O
14	CRYSTAL	00~03	3	O	X	O
15	FIELD FREQ.	00~03	2	O	X	O
16	INTERLACE	00~01	0	O	X	O
18	SYNCHRONIZATION	00~01	0	O	X	O
19	COLOR DECODER MODE	00~07	0	O	X	O
21	BLACK CURRENT STABILISATION	00~01	0	O	X	O
24	VERTICAL DIVIDER MODE	00~01	0	O	X	O
25	SEARCH TUNING MODE	00~01	0	O	X	O

IIC BUS CONTROL AND ADJUSTMENT

ADJ No.	NAME OF ADJUSTMENT DATA	DATA RANGE	INITIAL DATA(h)	ITEMS AFFECTED DURING CHANGE		
				EEPROM	CPT	TDA8842
26	VIDEO IDENT MODE	00~01	1	O	X	O
27	LONG BLANKING MODE	00~01	1	O	X	O
29	ENABLE VERTICAL GUARD	00~01	1	O	X	O
30	SERVICE BLANKING	00~01	0	O	X	O
32	PAL,SECAM/NTSC	00~01	0	O	X	O
36	AFC WINDOW	00~01	0	O	X	O
37	IF SENSITIVITY	00~01	0	O	X	O
39	VIDEO MUTE	00~01	0	O	X	O
40	AGC TAKE OVER	00~3F	10	O	X	O
41	SOUND MUTE	00~01	0	O	X	O
51	CHROMA BANDPASS C-FREQ.	00~01	1	O	X	O
54	VERTICAL SHIFT(V POSITION)	00~3F	2A	O	O	O
55	VERTICAL AMPLITUDE(V SIZE)	00~3F	15	O	O	O
56	BLUE STRETCH	00~01	1	O	X	O
57	S-CORRECTION	00~3F	07	O	O	O
58	BLACK STRETCH	00~01	1	O	X	O
59	VERTICAL SLOPE	00~3F	11	O	O	O
63	AUTO COLOR LIMITTING	00~01	1	O	X	O
65	START-UP-MODE OF BCL	00~01	0	O	X	O
66	CATHODE DRIVE LEVEL	00~07	05	O	X	O
68	DYNAMIC SKIN CTRL	00~01	1	O	X	O
69	DYNAMIC SKIN CTRL ANGLE	00~01	1	O	X	O
70	FAST FILTER IF-PLL	00~01	0	O	X	O
71	EXTENDED BLUE STRETCH	00~01	0	O	X	O
72	FORCED COLOR-ON	00~01	1	O	X	O
73	BASS SUB-DATA	06~19	0F	O	X	X
80	V-SCAN DISABLED	00~01	0	O	X	X
93	OPERATE AT PICK UP NOISE	00~01	0	O	X	X
94	INPUT LEVEL ADJUST	0~3F	20	O	X	X
95	FH MONITOR ON/OFF	00~01	0	O	X	X
96	STEREO VCO ADJUST	0~3F	20	O	X	X
97	PILOT CANCELER ON/OFF	00~01	0	O	X	X
98	FILTER ADJUST	00~3F	3F	O	X	X
99	LOW BAND FREQUENCY ADJUST	00~3F	20	O	X	X
100	HIGH FREQ.SEPARATION ADJUST	00~3F	20	O	X	X
101	5fH MONITOR	00~01	0	O	X	X
102	SAP VCO SETTING	00~3F	20	O	X	X
103	MUTE ON/OFF	0~1	0	O	X	X
104	SEPARATION ADJUST	00~3F	15	O	X	X
137	NICAM SET DATA > X	00~FF	0A	O	X	X
138	ERROR RATE < X	00~FF	0B	O	X	X
139	A2 STEREO JUDGE > X	00~7F	0F	O	X	X
140	A2 BILINGUAL JUDGE > X	80~FF	F2	O	X	X

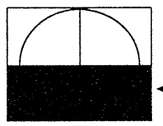
+B ADJUSTMENT

PREPARATION	PROCEDURES
1. AC input voltage 220±5V(50Hz). 2. Turns on the set and set the brightness and contrast to Max. (Signal : Philips Pattern) 3. After 30 sec heat-run, check & adjust the +B voltage. **Measuring Point** +B voltage : C953 + side GND : C953 - side	1. Adjust R950 to obtain +B voltage as below **+B voltage = 95±0.5V.**

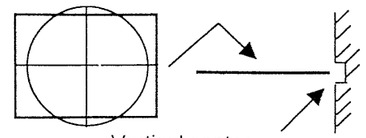
HORIZONTAL PHASE ADJUSTMENT

PREPARATION	PROCEDURES
1. Receive the circular pattern signal.	1. Select the IIC control address No 06. 2. Adjust the picture center to meet the CRT geometrical center.

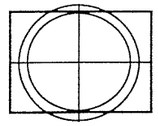
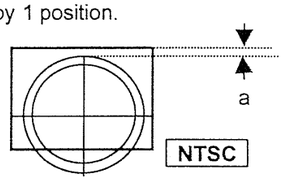
VERTICAL SLOPE ADJUSTMENT(Must be done before V. Center and V. Size Adjustments)

PREPARATION	PROCEDURES
1. Turns on the TV set and heat run about 5 min. 2. Receive circular pattern signal(PAL). 3. Set all picture settings as below. i.e. Contrast : Max Brightness : Center 4. AC 220±1V.	1. Select the IIC Control address No 30. 2. Press◀ or ▶key on remote con. handset so that the bottom half of the picture is blanked. i.e.  Bottom half of picture blanked. 3. Select the IIC control address No 59. 4. Adjust the vertical slope until the horizontal center line is just at the position where the blanking starts. 5. Select the IIC Control address No 30. 6. Press◀ or ▶key on remote con. handset so that picture appears again.

VERTICAL CENTER ADJUSTMENT

PREPARATION	PROCEDURES
1. Turns on the TV set & heat run about 5 min. 2. Receive the circular pattern signal. 3. AC 220 +- 1V.	1. Select the IIC control address No 54. 2. Set the horizontal center line to vertical center marker of CRT by adjustment of IIC. i.e.  Vertical center marker of CRT

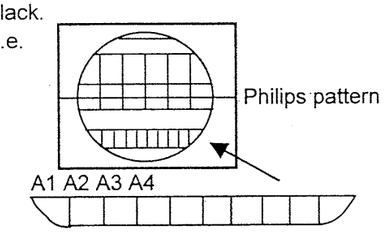
VERTICAL SIZE ADJUSTMENT

PREPARATION	PROCEDURES
1. Turns on the TV set & heat run about 5 min. 2. Receive the circular pattern signal. 3. Set all picture settings as below. i.e. Contrast : Max Brightness : Center 3. AC 220 +-.1V.	1. Select the IIC control address No 55. 2. Adjust IIC data to obtain the following conditions. I.e.  PAL Picture Top : Inner circle reach the edge of TV raster. Picture Bottom : Inner circle reach the edge of TV raster. 3. Receive the NTSC circular signal, and check the picture size after the above V-size adjustment. 4. If a>0mm, go back to IIC control No 54(V-center adjustment) and increase the IIC data by 1 position.  a NTSC

WHITE BALANCE ADJUSTMENT

PREPARATION	PROCEDURES
1. Switch on the TV set for at lease 20mins. 2. Adjust this adjustment after the Purity adjustment. 3. Ensure the vertical incident illumination on CRT surface to be 20 lux or less. 4. Receive the white balance raster. 5. Turns the low bright adjustment VRs R830 & R831 fully counterclockwise. 6. Select the IIC Control address No 01 (White point red), No 02(White point green) and No 03(White point bule) and set all datas to 1FH. 7. Turns the screen VR of FBT fully counter-clockwise. 8. Select the IIC Control address No 10(Sub-contrast) and set the data to 17. 9. Select the IIC Control address No 9(Sub-brightness) and set the data to 1F	1. Remain the screen at IIC Control mode, and press the [TV/VIDEO] button 1 time to obtain the lateral line mode. 2. Turns the Screen VR of FBT clockwise and set it to the position where the bright red line starts to appear. 3. Takes the red as the reference, adjust R830 & R831 till both appear to the same level as the red. 4. Adjusts the Screen VR of FBT until the white raster line is just slightly seen. 5. Release the lateral line mode by pressing the [TV/VIDEO] button once. 6. Set the White Balance meter probe at the center of the screen. 7. Adjusts the following keys of IIC and R830/ R831 to the desired W/B color temperature. IIC Adress No R Drive 01 B Drive 03 **Notes :** a. Fix the G Drive at 1FH(IIC Adress No. 02), do not adjust. b. To obtain the low brightness and high brightness conditions, adjust the brightness control of remote control handset.

SUB-BRIGHTNESS ADJUSTMENT(Must adjust after H. size adjustment)

PREPARATION	PROCEDURES
1. Switch on the TV set for at lease 20 min. 2. Ensure the vertical incident illumination on CRT surface to be 20 lux or less. 3. Receive the Color Circular Philips pattern. 4. Set the following settings by remote control handset. Contrast : max Color : Center Brightness : Center	1. Select the IIC control address No 09. 2. Adjust the data until A1 portion becomes black and A2 portion becomes lighter black. I.e. 

REPLACEMENT PARTS LIST

PRODUCT SAFTY NOTE : Components marked with a ⚠ have special characteristics important to safty. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

ABBREVIATIONS

Capacitors..... CD:Ceramic disk, PF:Polyester film, EL:Electrolytic, PP:Polypropylene, PR:Paper, TA:Tantalum, TM:Trimmer.

Resistors..... CF:Darbon film, CC:Carbon composition, MF:Metal oxide film, VR:Variable resistor, WW:Wire would, FR:Fuse resistor, MG:Metal glazed

Semiconductors..... TR:Transistor, DI:Diode, ZD:Zener diode, VA:Varistor, TH:Thermistor, IC:IC.

SYMBOL No.	PART No.	DESCRIPTION	SYMBOL No.	PART No.	DESCRIPTION
	TQD3001XXX	FRAME ASS'Y C2045MS	C216	0800282REX	ELECT CAP SMG 2.2UF-M 50V
	TQD3001XXX	FRAME ASS'Y C2145MS	C217	0880198R	POLY CAP 0.22UF-J 50V
	TQD3001XXX	FRAME ASS'Y C2048FS	C220	AN00624R	FILM CAP ECQB 0.01UF-K 50V
	TQD3001XXX	RRAME ASS'Y C2148FS	C301	AN00637R	POLY CAP 0.1UF-K 50V
	TQD3001XXX	FRAME ASS'Y C2081MS	C302	AN00637R	POLY CAP 0.1UF-K 50V
	TQD3001XXX	FRAME ASS'Y C2181MS	C304	0800022REX	ELECT CAP SMG 22UF 10V
	TQD3001XXX	FRAME ASS'Y C2086FS	C305	AN00637R	POLY CAP 0.1UF-K 50V
	TQD3001XXX	FRAME ASS'Y C2186FS	C351	0800352REX	ELECT ACP SMG 470UF 10V
	TQD3001XXX	FRAME ASS'Y C2081MSR	C352	0800291REX	ELECT CAP SMG 10UF-M 16V
	TQD3001XXX	FRAME ASS'Y C2181MSR	C353	0800291R	ELECT CAP SMG 10UF-M 16V
	TBC3001XXX	BACKCOVER ASS'Y	C354	0800325REX	ELECT CAP SMG 100UF 10V
	2415182A	SPEAKERr 4Ohm 5watt	C401	AN00624R	FILM CAP 0.01UF-K 50V
	2669601	4P CONNECTOR	C401	AN00624R	FILM CAP 0.01UFK 50V
	2976143	2P CONNECTOR (For Cxx81, 86xxx only)	C402	0800291REX	ELECT CAP SMG 10UF-M 16V
	2976143A	2P CONNECTOR (420MM) (For Cxx45, 48xxx only)	C403	AN00617R	FILM CAP ECQB 0.0033UF-K 50V
	2976756B	3P CONNECTOR	C408	0800291REX	ELECT CAP SMG 10UF-M 16V
⚠ B001	JK05182C	MAIN PWB	C409	0800291R	ELECT CAP SMG 10UF-M 16V
C001	0800294REX	ELECT CAP SMG 10UF 50V	C412	0800326REX	ELECT CAP SMG 100UF 16V
C002	0890122R	CER CAP CH 39PF-J 50V	C418	0800353R	ELECT CAP SMG 470UF 16V
C003	AN00633R	OPLY CAP 0.047UF-K 50V	C419	0800353REX	ELECT CAP SMG 470UF 16V
C004	AN00633R	OPLY CAP 0.047UF-K 50V	C420	0800308REX	ELECT CAP SMG 33UF-M 16V
C005	0890087R	CER CAP B 1000PF-K 50V	C445	0800362FEX	ELECT CAP 1000UF 25V
C006	AN00631R	OPLY CAP 0.033UF 50V	C452	0800277REX	ELECT CAP SMG 0.47UF 50V
C007	0890122R	CER CAP CH 39PF-J 50V	C453	0800277REX	ELECT CAP SMG 0.47UF 50V
C008	0890067R	CER CAP SL 33PF-J 50V	C454	0800325REX	ELECT CAP SMG 100UF 10V
C009	AN00626R	OPLY CAP 0.015UF 50V	C455	0800325REX	ELECT CAP SMG 100UF 10V
C010	ANOO624R	FILM CAP ECOB 0.010UF-K 50V	C456	AN00631R	POLY CAP 0.0330UF 50V
C011	0800351REX	ELECT CAP SMG 470UF 6.3V	C457	AN00621R	POLY CAP 0.0056UF 50V
C013	0800291REX	ELECT CAP SMG 10UF-M 16V	C460	AN00621R	POLY CAP 0.0056UF 50V
C033A	0880031R	POLY VSP 0.001 UF/50V	C461	AN00631R	POLY CAP 0.0330UF 50V
C051	0800291REX	ELECT CAP SMG 1-UF-M 16V	C462	AN00626R	POLY CAP 0.015UF 50V
C053	AN00624R	FILM CAP ECQB 0.01UF-K 50V	C463	0800277R	ELECT CAP SMG 0.470UF 50V
C102A	AN00637R	POLY CAP 0.1UF-K 50V	C464	AN00626R	POLY CAP 0.015UF 50V
C104	AN00624R	FILM CAP ECQB 0.01UF-K 50V	C465	0800277R	ELECT CAP SMG 0.47UF 50V
C201	0890087R	CER CAP B 1000PF-K 50V	C466	0800277R	ELECT CAP SMG 0.47UF 50V
C202	0800359R	CLECT CAP SMG 1000UF10V	C467	0800277R	ELECT CAP SMG 0.47UF 50V
C203	0890087R	CER CAP B 1000PF-K 50V	C502	0880198R	POLY CAP 0.22UF-J 50V
C206	AN00637R	POLY CAP 0.1UF-K 50V	C503	AN00633R	POLY CAP 0.047UF-K 50V
C207	AN00624R	FILM CAP ECQB 0.01UF-K 50V	C504	AN00633R	POLY CAP 0.047UF-K 50V
C208	0800316REX	ELECT CAP SMG 47UF 10V	C505	AN00633R	POLY CAP 0.047UF-K 50V
C209	0800277REX	ELECT CAP SMG 0.47UF 50V	C509	0890116R	CER CAP CH 15PF-J 50V
C210	AN00637R	POLY CAP 0.1UF-K 50V	C511	0890116R	CER CAP CH 15PF-J 50V
C211	0800366FEX	ELECT CAP SMG 2200UF 10V	C512	0880016R	POLY CAP 0.1UF-K 50V
C213	0800325REX	ELECT CAP SMG 100UF 10V	C513	AN00617R	FILM CAP ECQB 0.0033UF-K 50V
C214	AN00624R	FILM CAP ECQB 0.01UF-K 50V	C522	0800343REX	ELECT CAP 330UF 10V
C215	AN00628R	POLY CAP 0.022UF-K 50V	C601	0800288REX	ELECT CAP SMG 4.7UF-M 50V

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SYMBOL No.	PART No.	DESCRIPTION
C602	0890087R	CER CAP B 1000PF-K 50V
C603	0890087R	CER CAP B 1000PF-K 50V
C604	0890087R	CER CAP B 1000PF-K 50V
C605	AN00637R	POLY CAP 0.1UF-K 50V
C606	0890079R	CER CAP B 270PF-K 50V
C607	0800294REX	ELECT CAP SMG 10UF 50V
C608	0279693R	POLY CAP 0.1UF-K 100V
C609	AN00624R	FILM CAP ECQB 0.01UF-K 50V
C610	0279693R	POLY CAP 0.1UF-K 100V
C683	0279691R	POLY CAP 0.047UF 160V
C701	AN00615R	FILM CAP ECQB 0.0022UF-K 50V
C702	0800279REX	ELECT CAP SMG 1UF-M 50V
C703	AN00619R	POLY CAP 0.0047UF 50V
C723	0279851F	POLY CAP 0.022UF-K 100V
C725	0800326REX	ELECT CAP SMG 100UF 16V
C727	AN00624R	FILM CAP ECQB 0.01UF-K 50V
C745	0800326REX	ELECT CAP SMG 100UF 16V
C750	0800328REX	ELECT CAP SMG 100UF 35V
C751	0800321REX	ELECT CAP 47UF-M 50V
C753	0244501R	CER CAP B 1000PF-K 500V
C754	0800362FEX	ELECT ACP 1000UF 25V
C755	0800335R	ELECT CAP SMG 220UF-M 16V
C756	0253973F	ELECT CAP SME 22UF 250V
C758	AN00637R	POLY CAP 0.1UF-K 50V
C759	0244501R	CER CAP B 1000PF-K 500V
⚠ C781	AN1134F	CER CAP B 7500PF-K 2KV
⚠ C783	AJ00555	CER CAP 470PF/2KV
⚠ C784	AN01181F	POLY CAP 0.56UF 250V
⚠ C785	0244507R	CER CAP B 3300PF-K 500V
C786	0243512R	CER CAP B 820PF-K 500V
C787	0800288REX	ELECT CAP SMG 4.7UF-M 50V
C789	0890077R	CER CAP B 180PF-K 50V
C790	0244501R	CER CAP B 1000PF-K 500V
C795	AN00615R	FILM CAP ECQB 0.0022UF-K 50V
C801	0890083R	CER CAP B 470PF-K 50V
C802	0890083R	CER CAP B 470PF-K 50V
C803	0890084R	CER CAP B 560PF-K 50V
C805	AJ00542F	CER CAP B 4700PF-K 1KV
⚠ C901	AN00144S	POLY CAP 0.1UF-M 250V
⚠ C902	AN00144S	POLY CAP 0.1UF-M 250V
C903	0248593F	CER CAP F 4700PF-Z 250V
C904	0248593F	CER CAP F 4700PF-Z 250V
C905	0248594F	CER CAP F 0.01UF-Z 250V
C906	AL00097	ELECT CAP 180UF 450V
C907	0244215	CER CAP R 2200PF-K 2KV
C908	AN00624R	FILM CAP ECQB 0.01UF-K 50V
C909	0890075R	CER CAP SL 120PF-J 50V
C910	AN00615R	FILM CAP ECQB 0.0022UF-K 50V
C911	0270734R	POLY CAP 0.1UF-J 50V
C912	AN00624R	FILM CAP ECQB 0.01UF-K 50V
C913	AN00617R	FILM CAP ECOB 0.0033UF-K 50V
C914	0270743R	POLY CAP AMZ 0.47UF 50V
C915	0244718	CER CAP B 330PF-K 2KV
C952	0243507	CER CAP B 330PF-K 500V
C953	AL01211	ELECT CAP KMF 220UF 100V
C954	0800087REX	ELECT CAP SME 2200UF 16V
C955	0800326REX	ELECT CAP SMG 100UF 16V
C956	0258129F	ELECT CAP KME 220UF 100V
C957	0243509R	CER CAP B 470PF-K 500V
C958	AN00624R	POLY CAP 0.01UF-K 50V
C961	0800294REX	ELECT CAP SMG 10UF 50V
⚠ C998	AJ00601	POLY CAP 1000PF 250V
⚠ C999	AJ00603	POLY CAP 2200PF 250V
D002	2338321M	DIODE 1SS270
D003	2338321M	DIODE 1SS270
D004	2339022M	ZENER DIODE HZS6B2L
D301	2338321M	DIODE 1SS270
D302	2338321M	DIODE 1SS270
D401	2338321M	DIODE 1SS270
D402	2338321M	DIODE 1SS270
D420	2338321M	DIODE 1SS270
D421	2338321M	DIODE 1SS270
D451	2339481M	DIODE ASO1Z 200V
D501	2339869M	ZENER DIODE HZS9C3
D502	2339869M	ZENER DIODE HZS9C3
D503	2339869M	ZENER DIODE HZS9C3
D504	2339858M	ZENER DIODE HZS7C2
D505	2339869M	ZENER DIODE HZS9C3
D506	2338321M	DIODE 1SS270
D511	2338321M	DIODE 1SS270
D512	2339869M	ZENER DIODE HZS9C3
D610	2337341M	DIODE 1SS270A(TP)
D611	23373441M	DIODE 1SS270A (TP)
D719	2339921M	ZENER DIODE HZS20-1
D720	2339212M	ZENER DIODE HZS24-2L
D741	CH00711M	DIODE 10ELS2
D751	CH00712M	DIODE 10ELS4 400V
D752	CH00712M	DIODE10ELS4 400V
D753A	2338321M	DIODE 1SS270
D754	2335991M	ZENER DIODE HZT33-02
D755	2339827M	ZENER DIODE HZS4C1
⚠ D756	2339222M	ZENER DIODE HZS27-2L
D757	2338321M	DIODE 1SS270
D758	2338321M	DIODE 1SS270
D760	2339867M	ZENER DIODE HZS9C1
D901A	2338314	DIODE RBV-406M(LF-A)
D905	2339819M	ZENER DIODE HZS3C3
D906	2338321M	DIODE 1SS270
D907	CH00711M	DIODE 1OELS2
D908	2337341M	DIODE 1SS270A(TP)
D909	2339889M	ZENER DIODE HZS12C3
D910	CH00711M	DIODE 10ELS2
D911	2339835M	ZENER DIODE HZS5B2
D912	2339825M	ZENER DIODE HZS4B2
D913	2338321M	DIODE 1SS270
D914	CH00711M	DIODE 10ELS2
D915	2337341M	DIODE 1SS270A(PA)
D916	2339842M	ZENER DIODE HZS6A2
D920	2339921M	ZENER DIODE HZS20-1
D951	2349983	DIODE BYR 29F-600
D952	2349991	DIODE BYW 29F-200
D953	2339903M	ZENER DIODE HZS16-3
D954	2339853M	ZENER DIODE HZS7A3
D955	2339903M	ZENER DIODE HZS16-3
E203	2774731R	FERRITE BEAD CORE WITH LEAD
E301	2695261	6P JACK PIN
E402	2902261	2P PLUGPIN WITH BASE
E403	2902262	3P PLUGPIN WITH BASE

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SYMBOL No.	PART No.	DESCRIPTION
⚠ E801	2698712	CRT SOCKET 21"
E802	2903542A	1P PLUG PIN
E805	2995604	8P SUB MINI CONNECTOR W/WIRE
⚠ E903	0593587#	POWER CORD
E904	2661751	2P PLUGPIN WITH BASE
E905	2995909	2J PROCESSED WIRE WITH AMPIN
E906L	2729252BR	FUSE HOLDER
E906R	2729252BR	FUSE HOLDER
E950	3763751	SK SINDER 100 (WHITE)
EM	2665272	4P PLUG PIN WITH BASE
⚠ F901	2721615	FUSE 3.15A
FB001	2123468M	FERRITE CORE WITH LEAD 0.8UH
FB781	2122653M	FERRITE CORE WITH LEAD
⚠ FB901	2123468M	FERRITE CORE WITH LEAD 0.8UH
FB902	2123468M	FERRITE CORE WITH LEAD 0.8UH
FB903	2123468M	FERRITE CORE WITH LEAD 0.8UH
FB951	2123462M	FERRITE BEADS CORE B 2.3UH
FB952	2123462M	FERRITE BEADS CORE B 2.3UH
FB953	2123462M	FERRITE BEADS CORE B 2.3UH
FB954	2123462M	FERRITE BEADS CORE B 2.3UH
I001	CP05773	IC Z9023406PSCR4050
I002	CP03461	IC AT24AC04
I003	CP02871R	TRS IC KIA7042P
I201	CP05811U	IC TDA8842
I401	CP05801U	IC TAD9859
I402	CP05751	IC AN5276
I681	CP05651	IC TDA8356
⚠ I901	2917783	IC CNX82A 300
I951	CP04771	IC KIA7809PI
L001	2123105M	AXIAL COIL LALO2 15UH-K
L201	2123103M	AXIAL COIL LAL02 10UH-K
L202	2122253M	AXIAL COIL LAL04 1000UH-K
L205	2123104M	AXIAL COIL LALO2 0.2UH-K
L206	2122956M	AXIAL COIL LALO3 100UH-K
L601	BH00205R	HIGH FREQ, INDUCTOR 22UH
L781	2164541B	HORIZONTAL LINEARITY COIL
L802	2125804N	RADIAL COIL 33UH
⚠ L901	BZ02393	LINE FILTER
L903	2220595AR	CHOKE COIL 22UH
L951	BH00734R	PEAKING COIL 100 UH-K
L952	BH00734R	PEAKING COIL 100 UH-K
⚠ PR764	AZ00104M	2A PROTECTOR
⚠ PR765	AZ00105M	PROTECTOR 2.5A 49102.5T52
⚠ PR901	AZ00101M	0.5A PROTECTOR
⚠ PR951	AZ00106M	3A PROTECTOR
Q001	CF0142R	TRS. KTC3198 GR
Q002	CF01421R	TRS. KTC3198 GR
Q003	2320663M	TRS. TRS2SC1213AC
Q004	CF01421R	TRS. KTC3198 GR
Q201	CF01011R	TRS. (KEC) DTC3197
Q202	CF01431R	TRS. KTA 1266Y
Q204	CF01421R	TRS. KTC3198 GR
Q303	CF01431R	TRS. DTA 1266Y
Q401	CF01421R	TRS.DTC3198 GR
Q402	CF01421R	TRS. DTC3198 GR
Q420	CF01431R	TRS. KTA 1266Y
Q503	CF01421R	TRS. KTC3198 GR
Q504	CF01431R	TRS. KTA 1266Y
Q721	CF01061R	TRS. MPSA42
Q722	2320663M	TRS. 2SC1213AC
Q723	2312171	TRS. 2SC3852
⚠ Q745	CJ00161R	TRS. BT149-B
Q746	CF01421R	TRS. KTC3198 GR
Q781	CF02221	TRS. 2SD2578
Q851	CF02181	TRS. KSC2688
Q852	CF02181	TRS. KSC2688
Q853	CF02181	TRS. KSC2688
Q901	CF01431R	TRS. KTA 1266Y
Q902	CF01221	TRS. BD329
Q903	2314792	TRS. BUT12AF/ON4959
Q904	CF01421R	TRS. KTC3198 GR
Q905	CF01831	TRANSISTOR KTD2058Y
Q951	CF01051R	TRS. KTC 3200 GR
Q952	CF01421R	TRS. KTC3198 GR
Q953	CF01991R	TRS. KTA1273Y
Q954	CF01421F	TRS. KTC3198 GR
R006	0700054M	RES CAR FILM 1/16 10K-J
R007	0700062M	RES CAR FILM 1/16 39K-J
R008	0700062M	RES CAR FILM 1/16 39K-J
R009	0700054M	RES CAR FILM 1/16 10K-J
R010	0700056M	RES CAR FILM 1/16 15K-J
R013	0700027M	RES CAR FILM 1/16 100-J
R014	0700038M	RES CAR FILM 1/16 680-J
R016	0700054M	RES CAR FILM 1/16 10K-J
R017	0700067M	RES CAR FILM 1/16 100K-J
R018	0700027M	RES CAR FILM 1/16 100-J
R020	0700054M	RES CAR FILM 1/16 10K-J
R021	0700054M	RES CAR FILM 1/16 10K-J
R022	0700041M	RES CAR FILM 1/16 1K-J
R023	0700041M	RES CAR FILM 1/16 1K-J
R024	0700041M	RES CAR FILM 1/16 1K-J
R025	0700041M	RES CAR FILM 1/16 1K-J
R026	0700052M	RES CAR FILM 1/16 6.8K-J
R027	0700052M	RES CAR FILM 1/16 6.8K-J
R028	0700052M	RES CAR FILM 1/16 6.8K-J
R029	0700047M	RES CAR FILM 1/16 3.3K-J
R030	0700055M	RES CAR FILM 1/16 12K-J
R031	0700054M	RES CAR FILM 1/16 10K-J
R032	0700027M	RES CAR FILM 1/16 100-J
R033	0700051M	RES CAR FILM 1/16 5.6K-J
R034	0700058M	RES CAR FILM 1/16 22K-J
R035	0700051M	RES CAR FILM 1/16 5.6K-J
R036	0700064M	RES CAR FILM 1/16 56K-J
R037	0700058M	RES CAR FILM 1/16 22K-J
R038	0700058M	RES CAR FILM 1/16 22K-J
R039	0700048M	RES CAR FILM 1/16 3.9K-J
R040	0700048M	RES CAR FILM 1/16 3.9K-J
R041	0700027M	RES CAR FILM 1/16 100-J
R042	0700027M	RES CAR FILM 1/16 100-J
R043	0700027M	RES CAR FILM 1/16 100-J
R044	0700027M	RES CAR FILM 1/16 100-J
R045	0700027M	RES CAR FILM 1/16 100-J
R046	0700027M	RES CAR FILM 1/16 100-J
R047	0700046M	RES CAR FILM 1/16 2.7K-J
R048	0700043M	RES CAR FILM 1/16 1.5K-J
R053	0700058M	RES CAR FILM 1/16 22K-J
R054	0700058M	RES CAR FILM 1/16 22K-J
R056	0700047M	RES CAR FILM 1/16 3.3K-J

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SYMBOL No.	PART No.	DESCRIPTION	SYMBOL No.	PART No.	DESCRIPTION
R057	0700047M	RES CAR FILM 1/16 3.3K-J	R458	0700027M	RES CAR FILM 1/16 100/J
R058	0700054M	RES CAR FILM 1/16 10K-J	R459	0700027M	RES CAR FILM 1/16 100-J
R059	0700041M	RES CAR FILM 1/16 1K-J	R501	0700027M	RES CAR FILM 1/16 100-J
R060	0700051M	RES CAR FILM 1/16 5.6K-J	R502	0700027M	RES CAR FILM 1/16 100-J
R062	0700041M	RES CAR FILM 1/16 1K-J	R503	0700027M	RES CAR FILM 1/16 100-J
R064	0700041M	RES CAR FILM 1/16 1K-J	R507	0700027M	RES CAR FILM 1/16 100-J
R101	0700058M	RES CAR FILM 1/16 22K-J	R508	0700027M	RES CAR FILM 1/16 100-J
R102	0700063M	RES CAR FILM 1/16 47K-J	R509	0700027M	RES CAR FILM 1/16 100-J
R103	0700054M	RES CAR FILM 1/16 10K-J	R510	0700027M	RES CAR FILM 1/16 100-J
R104	0700054M	RES CAR FILM 1/16 10K-J	R515	0700067M	RES CAR FILM 1/16 100K-J
R201	0700052M	RES CAR FILM 1/16 6.8K-J	R516	0700058M	RES CAR FILM 1/16 22K-J
R202	0700042M	RES CAR FILM 1/16 1.2K-J	R517	0700055M	RES CAR FILM 1/16 12K-J
R204	0700019M	RES CAR FILM 1/16 27-J	R518	0700053M	RES CAR FILM 1/16 8.2K-J
R205	0700033M	RES CAR FILM 1/16 270-J	R519	0700049M	RES CAR FILM 1/16 4.7K-J
R213	0700038M	RES CAR FILM 1/16 680-J	R520	0700054M	RES CAR FILM 1/16 100K-J
R214	0700058M	RES CAR FILM 1/16 22K-J	R521	0700045M	RES CAR FILM 1/16 2.2K-J
R215	0700026M	RES CAR FILM 1/16 82-J	R522	0700027M	RES CAR FILM 1/16 100-J
R221	0700033M	RES CAR FILM 1/16 270-J	R523	0700045M	RES CAR FILM 1/16 2.2K-J
R222	0700045M	RES CAR FILM 1/16 2.2K-J	R526	0700027M	RES CAR FILM 1/16 100-J
R223	0700027M	RES CAR FILM 1/16 100-J	R527	0700027M	RES CAR FILM 1/16 100-J
R226	0700035M	RES CAR FILM 1/16 390-J	R528	0700027M	RES CAR FILM 1/16 100-J
R234	0700027M	RES CAR FILM 1/16 100-J	R601	0700027M	RES CAR FILM 1/16 100-J
R235	0100057M	RES CAR FILM 1/8 470-J	R602	0700027M	RES CAR FILM 1/16 100-J
R240	0700027M	RES CAR FILM 1/16 100-J	R603	0700062M	RES CAR FILM 1/16 39K-J
R241	0700027M	RES CAR FILM 1/16 100-J	R604	0700046M	RES CAR FILM 1/16 2.7K-J
R242	0119687G	RES MTL FILM 1/4 4.7-J	R605	0119732M	RES MTL FILM 1W 1.2-J
R301	0700036M	RES CAR FILM 1/16 470-J	R606	0700027M	RES CAR FILM 1/16 100-J
R302	0700027M	RES CAR FILM 1/16 100-J	R607	0179598M	CF 6.8M OHM 1/8
R304	0700054M	RES CAR FILM 1/16 10K-J	R608	0179597M	CF 1/8W 5.6M OHM
R309	0700027M	RES CAR FILM 1/16 100-J	R681	0110129S	RES MIL OXIDE 1W 220-J
R310	0700036M	RES CAR FILM 1/16 470-J	R682	0100035M	RES CAR FILM 1/8 56-J
R330	0100045M	RES CAR FILM 1/8 150-J	R701	0700027M	RES CAR FILM 1/16 100-J
R357	0100041M	RES CAR FILM 1/8 100-J	R702	0700059M	RES CAR FILM 1/16 27K-J
R358	0100041M	RES CAR FILM 1/8 100-J	R703	0700056M	RES CAR FILM 1/16 15K-J
R359	0100113M	RES CAR FILM 1/8 100K-J	R704	0700045M	RES CAR FILM 1/16 2.2K-J
R360	0100053M	RES CAR FILM 1/8 330-J	R719A	0113752M	RES CAR FILM 1/2 1.2K-J
R361	0100113M	RES CAR FILM 1/9 100K-J	R719	0110253S	RES MTL OXIDE 2W 2.2KJ
R362	0100041M	RES CAR FILM 1/8 100-J	R719A	0113752M	RES CAR FILM 1/2 1.2K-J
R363	0100113M	RES CAR FILM 1.8 100K-J	⚠ R720	0110359S	RES MTL OXIDE 3R 3.9K-J
R364	0100037M	RES CAR FILM 1/8 68-J	R730	0700047M	RES CAR FILM 1/16 3.3K-J
R365	0100113M	RES CAR FILM 1/8 100K-J	R741	0700032M	RES CAR FILM 1/16 220-J
R366	0100041M	RES CAR FILM 1/8 100-J	⚠ R742	0700055M	RES CAR FILM 1/16 12K-J
R406	0700027M	RES CAR FILM 1/16 100-J	R744	0100065M	RES CAR FILM 1/8 1K-J
R407	0700041M	RES CAR FILM 1/16 1K-J	⚠ R745	0700039M	RES CAR FILM 1/16 820-J
R408	0700041M	RES CAR FILM 1/16 1K-J	R751	0114219M	RES CAR FILM 1/4 56K-J
R409	0700041M	RES CAR FILM 1/16 1K-J	R752	0114213M	RES CAR FILM 1/4 33K-J
R420	0700054M	RES CAR FILM 1/16 10K-J	R753	0100049M	RES CAR FILM 1/8 220-J
R440	0700051M	RES CAR FILM 1/16 5.6K-J	⚠ R757	0118969M	RES MTL FILM 1/4 220K-F
R441	0700051M	RES CAR FILM 1/16 5.6K-J	⚠ R758	0119643M	RES MTL FILM 1/8 33K-F
R442	0700043M	RES CAR FILM 1/16 J.5K-J	R760	0100093M	RES CAR FILM 1/8 15K-J
R444	0700043M	RES CAR FILM 1.16 1.5K-J	R761	0700041M	RES CAR FILM 1/16 1K-J
R445	0700036M	RES CAR FILM 1/16 470-J	R762	0700051M	RES CAR FILM 1/16 5.6K-J
R451#	0700027M	RES CAR FILM 1/16 100-J	R781	0147626A	RES WIRE WOUND 7W 4.7-K
R452#	0700027M	RES CAR FILM 1/16 100-J	R782	0110285S	RES MTL OXIDE 2W 47K-J
R453	0700027M	RES CAR FILM 1/16 100-J	R783	0100091M	RES CAR FILM 1/8 12K-J
R454	0700027M	RES CAR FILM 1/16 100-J	R784	0113748M	RES CAR FILM 1/2 820-J
R455	0700054M	RES CAR FILM 1/16 10K-J	R801	0700027M	RES CAR FILM 1/16 100-J
R456	0700027M	RES CAR FILM 1/16 100-J	R802	0700027M	RES CAR FILM 1/16 100-J
R457	0700027M	RES CAR FILM 1/16 100-J	R803	0700027M	RES CAR FILM 1/16 100-J

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SYMBOL No.	PART No.	DESCRIPTION	SYMBOL No.	PART No.	DESCRIPTION
R804	0700033M	RES CAR FILM 1/16 270-J	RK337	0100047M	RES 1/8 180-J
R805	0700033M	RES CAR FILM 1/16 270-J	RK338	0100047M	RES 18 180-J
R806	0700033M	RES CAR FILM 1/16 270-J	T721	BS00011	H.DRIVE TRANS
R807	0700042M	RES CAR FILM 1/16 1.2K-J	⚠ T761	BW00991	FBT
R808	0700043M	RES CAR FILM 1/16 1.5K-J	⚠ T901	BT01061	SWITCHING TRANSFORMER
R809	0700043M	RES CAR FILM 1/16 1.5K-J	TH901	2341323	THERMISTOR (MURATA)
R809	0700043M	RES CAR FILM 1/16 1.5K-J	U001	HJ00381	TUNER
R811	0110271S	RES MTL OXIDE 2W 12K-J		BY00661	KDY 3MC 612HD (For C20xxxx only)
R812	0110271S	RES MTL OXIDE 2W 12K-J		BY00671	KDY 3NC 613HD (For C21xxxx only)
R813	0110271S	RES MTL OXIDE 2W 12K-J	⚠ V1	2358733	CRT 20"
R814	0113744M	RES CAR FILM 1/2 560-J		2358742	CRT 21"
R815	0113744M	RES CAR FILM 1/2 560-J	X002	2168371	X'TAL 6MHZ
R816	0113744M	RES CAR FILM 1/2 560-J	X003	2791754R	LC FILTER DSS306-55H101M
R830	AW00073	VARIABLE RES. 500-B	X004	2791754R	LC FILTER DSS306-55B101M
R831	AW00073	VARIABLE RES. 500-B	X201	BG00081	SAW FILTER G1963M
R832	AW00073	VARIABLE RES 500-B	X201	BG01491U	SAW FILTER TSF 5370P
R833	0700039M	RES CAR FILM 1.16 820-J			(FOR MULTI SYSTEM ONLY)
R834	0700039M	RES CAR FILM 116 820-J	X201	BG01481U	SAW FILTER K6276K
R835	0700039M	RES CAR FILM 1/16 820-J			(FOR FULL MULTI SYSTEM ONLY)
R900	0147518A	RES WIRE WOUND 5W 1.2-J	X202	BN00171	CER,TRAP 5.5/5.7MHZ
R901	0147616	RES WIRE WOUND 7W 1.8-K	X203	BN00172	CER,TRAP 6.0/6.5MHZ
R902	0147610X	RES WIRE WOUND 7W 1.0-J	X204	BN00171	CER,TRAP 5.5/5.7MHZ
R903	0113791M	RES CAR FILM 1/2 47K-J	X401	2167213B	CERAMIC FILTER 6.5MHZ
R904	0113787MQ	RES CAR FILM 1/2 33K-J	X402	2167212B	CERAMIC FILTER 6.0MHZ
R905	0100085M	RES CAR FILM 1/8 6.8K-J	X403	2167211B	CERAMIC FILTER 5.5MHZ
R906	0113754M	RES CAR FILM 1/2 1.5K-J	X501	2791505	CRYSTAL HC-49/U 3579.545KHZ
R907	AT00962F	RES MTL OXIDE 7W 220J	X503	2170043	CRYSTAL X'TAL 4.43(KSS)
R908	AT00966F	RES MTL OXIDE 7W 470J	D001	CH00231P	LED RED(APEC GLOBAL)
R909	AT00966F	RES MTL OXIDE 7W 470J	S01,S02	FE00281	TACT SWITCH
R910	0700043M	RES CAR FILM 1/16 1.5K-J	⚠ S901	2634732	MAINS SWITCH
R911	0114053M	RES CAR FILM 1/4 33-J	X001	CZ00641	REMOCON RECEIVER
R912	0114131M	RES CAR FILM 1/4 100-J		1ED2001	PHONE PLUG ANT. WIRE (For CxxxxMSR only)
R913	0700032M	RES CAR FILM 1/16 220-J		EF08681	FM ANT COIL (For CxxxxMSR only)
R914	0113692M	RES CAR FILM 1/2W 4.7-J	#C760	0800291R	CAP-ELECTRO 10UF 16V (For CxxxxMSR only)
R915	0114165M	RES CAR FILM 1/4 1.5K-J	#R723	0100057M	RES-CARBON FLM 1/8W 470-JB
R916	0114165M	RES CAR FILM 1/4 1.5K-J			(For CxxxxMSR only)
R917	0100041M	RES CAR FILM 1/8 100-J	D721	2339854M	ZENER HZS7B1 TA (For CxxxxMSR only)
R918	0100093M	RES CAR FILM 1/8 15K-J	D753#	2333001M	DIODE RU2M (For CxxxxMSR only)
R919	0700058M	RES CAR FILM 1/16 22K-J	D759	2339843M	ZENER HZS-6 A3 (For CxxxxMSR only)
R950	AW00102	RES VARIABLE RV6 1K-B	DC411	2339122M	HZ211C2L (For CxxxxMSR only)
R951	0113791M	RES CAR FILM 1/2 47K-J	L402	BZ02631	FM ANT. COIL (For CxxxxMSR only)
R952	0100078M	RES CAR FILM 1/8 3.6K-J	Q724	CF01431R	TES. KTA 1266Y (For CxxxxMSR only)
R953	0700047M	RES CAR FILM 1/16 3.3K-J	Q725	2312171	TRS.2SC3852 (For CxxxxMSR only)
R954	0113789M	RES CAR FILM 1/2 39K-J	R051	0700027M	RES CAR FILM 1/16 100-J (For CxxxxMSR only)
R955	0110155S	RES MTL OXIDE 1W 2.7K-J	R052	0700027M	RES CAR FILM 1/16 100-J (For CxxxxMSR only)
R956	0700049M	RES CAR FILM 1/16 4.7K-J	R065	0700047M	RES CAR FILM 1/16 3.3K-J (For CxxxxMSR only)
R957	0700049M	RES CAR FILM 1/16 4.7K-J	R066	0700027M	RES CAR FILM 1.16 100-J (For CxxxxMSR only)
R958	0700049M	RES CAR FILM 1/16 4.7K-J	R460	0700057M	RES 1/16 18K-J (For CxxxxMSR only)
R959	0700049M	RES CAR FILM 1/16 4.7K-J	R721	0110211S	RES-MTLOXIDE FLM 2W 39-JS
R960	0700043M	RES CAR FILM 1/16 1.5K-J			(For CxxxxMSR only)
R961	0100075M	RES CAR FILM 1/8 2.7K-J	R722	0110210S	RES-MTLOXIDE FLM 2W 15-JS
R962	0113742M	RES CAR FILM 1/2 470-J			(For CxxxxMSR only)
⚠ R998	0174704	RES MTL OXIDE 1W 10M-J	R724	0700041M	RES-CARBON FLM 1/16W 1K-JB
RK230	0700043M	RES CAR FILM 1/16 1.5K-J			(For CxxxxMSR only)
RX239	0700059M	RES CAR FILM 1/16 27K-J	R725	0700054M	RES-CARBON FLM 1/16W 10K-J
RK332	0100033M	RES CAR FILM 1/8 47 OHM			(For CxxxxMSR only)
RK334	0100047M	RES 1/8 180-J	R727	0700054M	RES-CARBON FLM 1/16W 10K-J
RK335	0100047M	RES 1/8 180-J MAIN PWB			(For CxxxxMSR only)
RK336	0100047M	RES 1/8 180-J			

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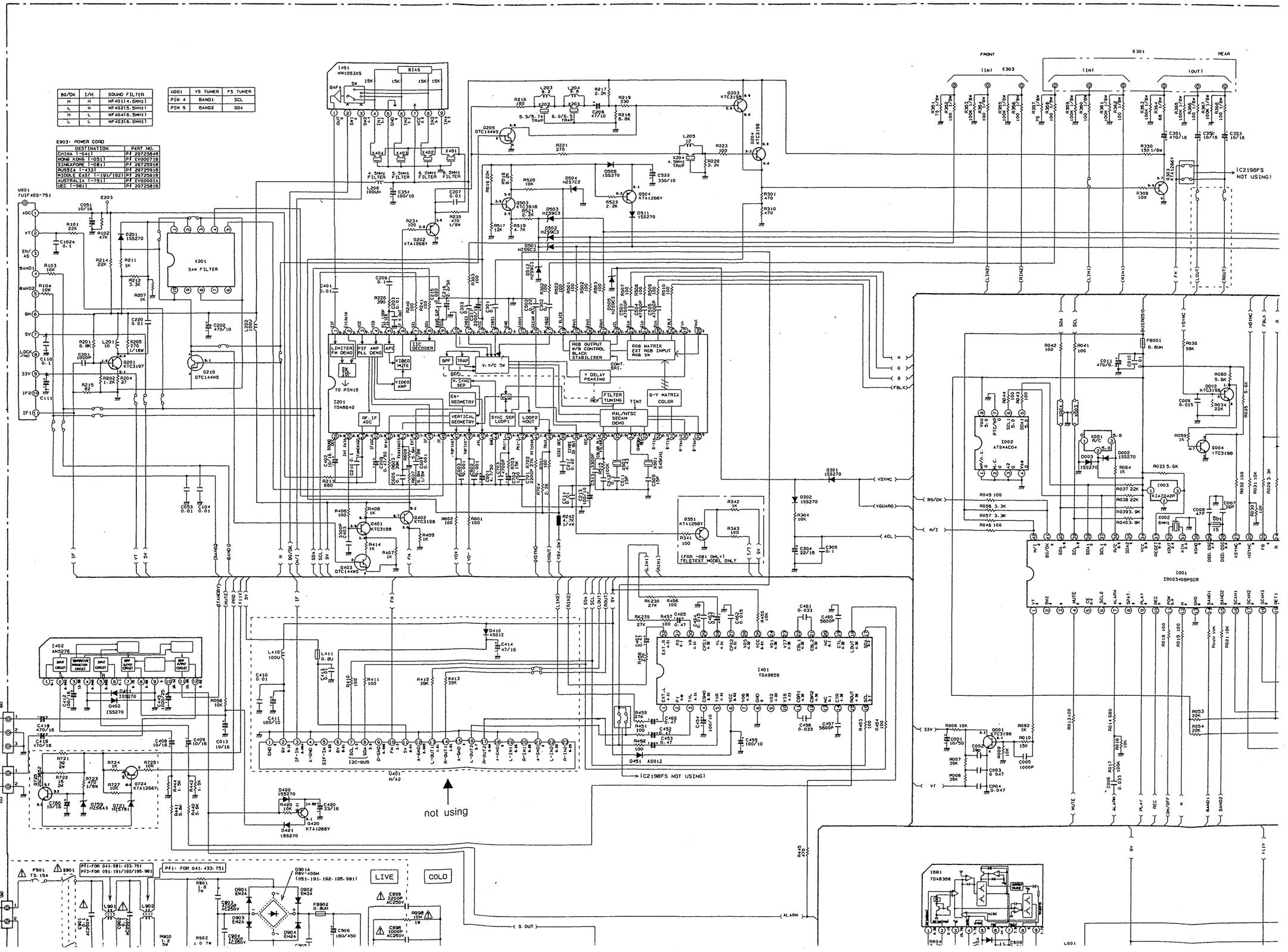
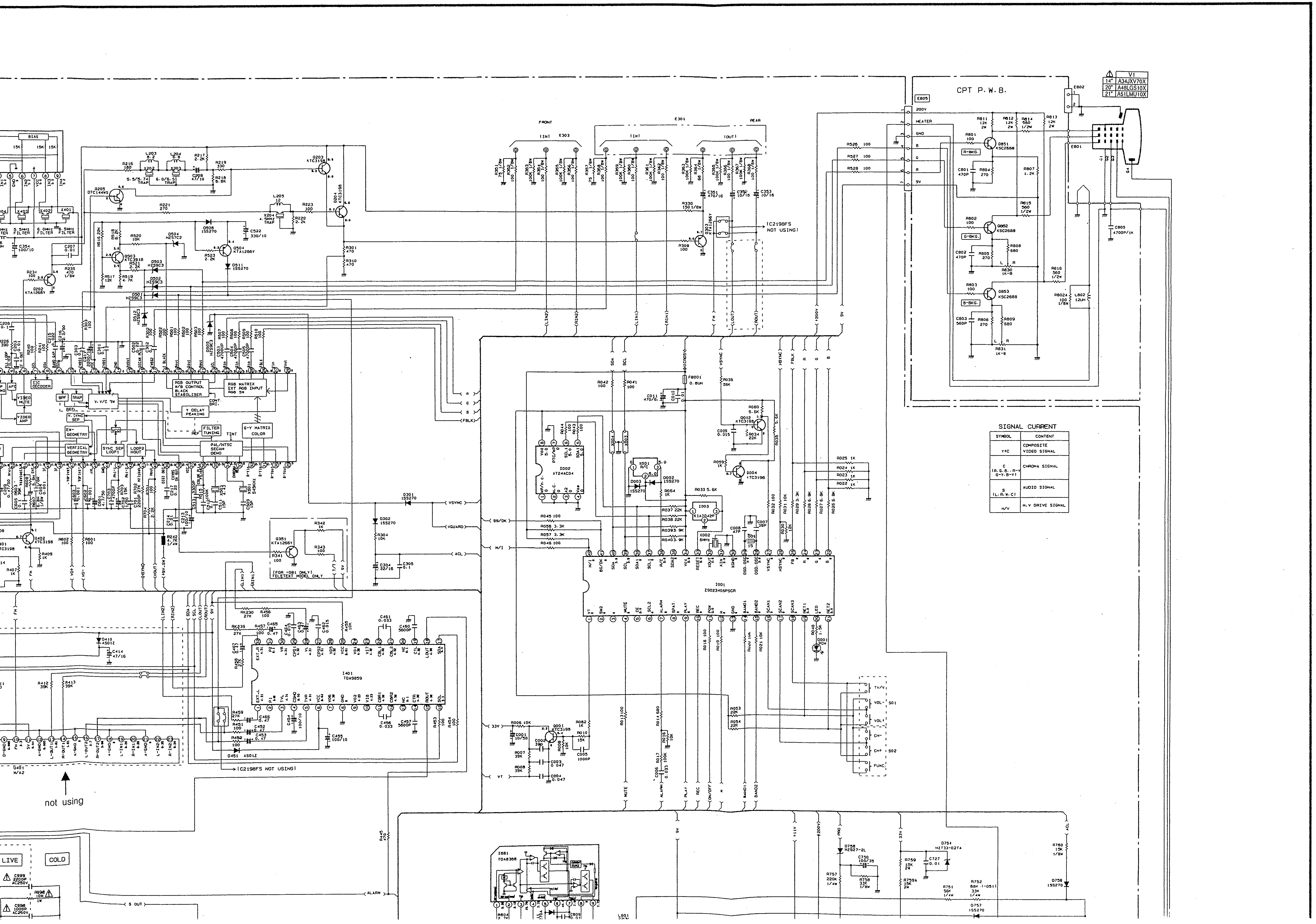
SYMBOL No.	PART No.	DESCRIPTION	SYMBOL No.	PART No.	DESCRIPTION
R759#	0110267S	RES 2W 8.2K-J (For CxxxxMSR only)			
RK220	0700054M	RES CAR FILM 1/16 10K-J (For CxxxxMSR only)			
RK221	0700054M	RES CAR FILM 1/16 10K-J (For CxxxxMSR only)			
U402#	CW00312	FM MODULE (For CxxxxMSR only)			
W3	9374948	UL1007-24 ORANOR L=30mm. (For CxxxxMSR only)			
W4	9374948	UL 1007-24 ORANOR L=160mm. (For CxxxxMSR only)			
ZW4	9485158	HOT MELT FOR W4 (For CxxxxMSR only)			

MEMO

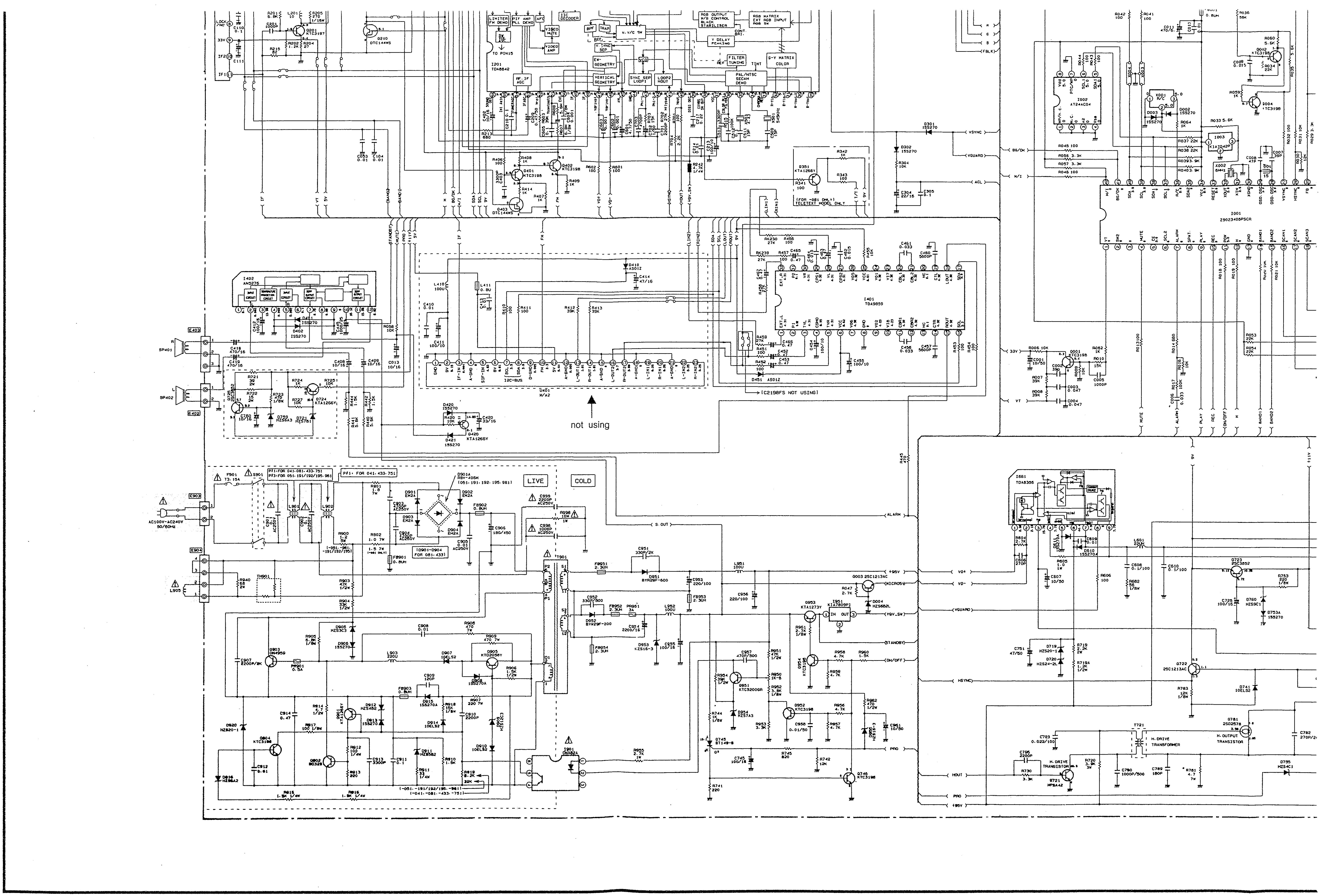
BASIC CIRCUIT DIAGRAM
V2 CHASSIS





SIGNAL CURRENT

SYMBOL	CONTENT
Y+C	COMPOSITE VIDEO SIGNAL
C (R.G.B..R-Y G-Y.B-Y)	CHROMA SIGNAL
S (L.R.W.C)	AUDIO SIGNAL
H/V	H.V DRIVE SIGNAL


I201 TDA8842
LIMITER FM DEMO
PIF AMP PLL DEMO
AFC
IIC DECODER
VIDEO MUTE
VIDEO AMP
TO PIN15
RF, IF AGC
V.Y/C SW
BPF
TRAP
Y SYNC SEP
EW-GEOMETRY
VERTICAL GEOMETRY
VCO
SYNC SEP LOOP1
LOOP2 HOUT
RGB OUTPUT W/B CONTROL BLACK STABILISER
RGB MATRIX EXT RGB INPUT RGB SW
Y DELAY PEAKING
CONT. BRI.
FILTER TUNING
TINT
G-Y MATRIX COLOR
PAL/NTSC SECAM DEMO
I402 AN5276
INPUT CIRCUIT
TEMPERATURE PROTECTION CIRCUIT
SEPP OUTPUT CIRCUIT
SP401
SP402
E403
E402
E903
E904
AC100V-AC240V 50/60Hz
L905
TH901
F901 T3.15A
S901
PF1: FOR 041·081·433·751
PF3: FOR 051·191/192/195·981
PF1: FOR 041·433·751
D901A RBV-406M (051·191·192·195·981)
(D901-D904 FOR 081·433)
LIVE
COLD
T901
I901 CNX82A
U401 M/A2
I2C-BUS
not using
I401 TDA9859
(C2198FS NOT USING)
(FOR -081 ONLY) TELETEXT MODEL ONLY
Q351 KTA1266Y
I002 AT24AC04
I003 K1A7042P
X002 6MHz
I001 Z9023406PSCR
I681 TDA8356
I951 KIA7809PI
T721
H. DRIVE TRANSFORMER
H. DRIVE TRANSISTOR
H. OUTPUT TRANSISTOR
Q781 2SD2578
Q721 MPSA42
Q722 2SC1213AC
Q723 2SC3852
Q003 2SC1213AC
Q953 KTA1273Y
Q951 KTC3200GR
Q952 KTC3198
Q954 KTC3198
Q745 BT149-B
Q746 KTC3198
Q903 2N4959
Q905 KTD2058Y
Q902 BD328
Q904 KTC3198
Q901 KTA1266Y
+95V
MICRO5V
+9V_SW
STANDBY
ON/OFF
PRO
HOUT
HSYNC
VSYNC
VGUARD
ALARM
S.OUT
ACL
BG/DK
M/I
VT
33V
MUTE
PLAY
REC
BAND1
BAND2
9V
+11V

Since this is basic circuit diagram, the value of the parts is subject to be altered for improvement

SIGNAL CURRENT

SYMBOL	CONTENT
Y+C	COMPOSITE VIDEO SIGNAL
C (R, G, B, -R-Y, G-Y, B-Y)	CHROMA SIGNAL
S (L, R, W, C)	AUDIO SIGNAL
H/V	H, V DRIVE SIGNAL

not using

TPA2003401

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